



Full length article

Medication use in pregnancy and lactation: A gap to be filled in postgraduate medical education



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ABSTRACT

Objective: Medication use is a common therapeutic intervention during pregnancy, in the postpartum period and during lactation. Women routinely consult a variety of medical practitioners to request advice and prescription of medication. However, it is noted internationally that healthcare providers have insufficient knowledge to support women through their therapeutic journeys, and continual education is not provided as routine during postgraduate training and practice.

Study Design: There are five colleges in Ireland responsible for postgraduate medical training in Ireland for medicine, surgery, general practice, anaesthesiology and psychiatry. These are responsible for the curriculum design and implementation of 45 training programs, with the Royal College of Physicians responsible for 26 training programs and the Royal College of Surgeons of Ireland responsible for 15 training programs. We reviewed the national postgraduate training curricula of all speciality in the Republic of Ireland, excluding care of the elderly and pathology (given these practitioners would not be actively prescribing and treating pregnant or lactating women).

Results: We demonstrate that less than 50 % of the 43 post-graduate training programs mention medications in pregnancy and lactation. Pregnancy is not mentioned by 12 programs in any degree, and 18 programs do not mention lactation or breastfeeding in any form.

Conclusion: It is imperative that consistent knowledge is provided and accessible to healthcare providers in order to support women and their families through healthy pregnancies, and support breastfeeding for as long as possible. Therefore, we call on postgraduate training bodies to include comprehensive education on medications in pregnancy and lactation in their syllabi going forward.

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Background

Over 90 % of women will take some form of medication in pregnancy, which may be obtained over-the-counter or prescribed [1]. Historically during the last century, there was a heightened concern regarding the use of some medications owing to a number of medication-associated adverse events, such as with thalidomide and diethylstilbestrol.² Teratogenicity can be a concern, causing prescribers to be reluctant in the prescription of medication [1], also influenced by the lack of high-quality evidence supporting their use in the form of clinical trials [3]. This trend is supported by

a long-established culture of nihilism towards medical interventions which pervades medical practice to this day [2]. Therefore, medication management of maternal medical conditions and suitability of medications in pregnancy and lactation should be an area of focus in the education and training of medical practitioners in order to provide the highest level of care to women and their families.

Pregnancy is a frequent life event for women and families, with recent data from the Organisation for Economic Co-operation and Development showing that women in Ireland, on average, have 1.8 children [4]. Current figures from the Central Statistics Office estimate that there are over 1.02 million women of childbearing potential [5]. In 2019, there were 59,796 births in Ireland, with an annual birth rate of 12.1 per thousand population [6]. During pregnancy and lactation, women routinely consult medical practitioners, both related to pregnancy and lactation, but also other healthcare conditions that they may need to seek medical treatment for. It has long been quoted that “sick women

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get pregnant and pregnant women get sick” [7], and that rings true to this day as there is an increasing prevalence of women getting pregnant with chronic health conditions with increased complexity of care requiring input from the multi-disciplinary team. For these reasons, it is imperative that healthcare providers have the appropriate knowledge and experience to manage women who are planning pregnancy, are currently pregnant or are breastfeeding. In the case of the latter, the World Health Organization recommend exclusive breastfeeding for the first six months of an infants' life and breastfeeding to continue until two years of age and beyond [8].

Previous work has demonstrated sub-optimal knowledge of healthcare providers on the use of medicines in pregnancy, despite some education being provided in medical school curricula [9]. Similarly, poor physician knowledge has been noted around lactation and breastfeeding, including practical elements and those related to safe medication use [10]. While primary care providers acknowledge a positive attitude to breastfeeding, they feel they can lack the knowledge in order to provide strong support [11]. Personal experience plays a key role for these physicians in the education that they can provide to women, with only 10 % reporting education provision on lactation during primary care training [12].

In order to examine this to a greater extent and inform educational interventions, we aimed to examine the curricula of all medical specialties in the Republic of Ireland for content relating to pregnancy and lactation with a focus on medication.

Material and methods

We conducted a descriptive review of all medical specialties that have active training programs in the Republic of Ireland in January 2021. There are five colleges responsible development and delivery of postgraduate medical education to doctors in the Republic of Ireland: Royal College of Physicians of Ireland (26 training programs), Royal College of Surgeons of Ireland (15 training programs), College of Anaesthesiologists of Ireland (1 training program), Irish College of General Practitioners (2 training programs) and the College of Psychiatrists of Ireland (1 training program). Each colleges' website was accessed and the speciality programs enumerated and curricula downloaded from the website. The most recent published curriculum was included for review.

The first author then undertook a review of each curriculum, both reading the curriculum in-depth and also searching for each of the terms “pregnancy”, “pregnant”, “lactation” and “breastfeeding” to enumerate areas in each curriculum where these words were mentioned.

Two curricula were excluded from analysis (care of the elderly and pathology) as both of these specialties do not typically interact with women of childbearing age or influence their clinical care.

Given that this study was observational and a review of information that is freely available, ethical approval was not required.

Results

Table 1 demonstrates the extent to which pregnancy and lactation are mentioned as part of the training objectives of these training schemes. Pregnancy is not mentioned to any degree by 12 training programs, and 18 programs do not mention lactation or breastfeeding in any form. When we examine references to medication in the setting of pregnancy or lactation, there is only mention of this in 24 of the 42 curricula.

Of those specialties running under the auspices of the Royal College of Physicians of Ireland, most include two standard statements on drugs and therapeutics (“the effects of age, body size, organ dysfunction and concurrent illness or physiological state, e.g., pregnancy on drug distribution and metabolism relevant to own practice” and “appropriate prescribing for the elderly, children and pregnant and breast-feeding women”). When this statement is excluded from analysis, only 10 of the 24 specialties (namely cardiology, clinical genetics, clinical pharmacology, clinical microbiology, genito-urinary medicine, nephrology, neurology, pharmaceutical medicine, rheumatology and respiratory medicine) have alternative mentions relevant to drugs and therapeutics in pregnancy and lactation.

Of note, a draft version of a new curriculum for emergency medicine trainees is due to be released in August 2021, yet there remains no mention of breastfeeding,¹⁴ which as demonstrated above is consistent with the majority of training programs within the Royal College of Surgeons of Ireland.

Discussion and conclusion

Through our review, we have demonstrated the lack of information in the training programs for those pursuing speciality training in medicine in the Republic of Ireland. While some programs do have references to education topics in pregnancy and lactation, these are often not in-depth and are statements which cover a vast amount of information, rather than being specific. Moreover, when this is expanded to include therapeutics, the guidance for trainees and their trainers is even more sparse. It is thus difficult to ascertain the level of information that trainees need to have or aim for in order to provide safe, effective and high-quality care to women and their infants.

Table 1
Higher Specialist Training programs and references to pregnancy/lactation.

College	Number of Training Programs	Reference to Pregnancy n (%)	Reference to Lactation n (%)	Reference to Medication in Pregnancy or Lactation n (%)
Royal College of Physicians of Ireland ^a [13]	24	23 (95.8 %)	20 (83.3 %)	15 (62.5 %)
Royal College of Surgeons of Ireland [14]	15	5 (33 %)	2 (13.3 %)	1 (6.6 %)
College of Psychiatrists of Ireland [15]	1	1 (100 %)	1 (100 %)	1 (100 %)
College of Anaesthesiologists of Ireland [16]	1	1 (100 %)	1 (100 %)	1 (100 %)
Irish College of General Practitioners [17]	2	1 (50 %)	1 (50 %)	0 (0%)
Total	43	31 (72.1 %)	25 (58.1 %)	18 (41.8 %)

^a Care of the Elderly Geriatric medicine and Pathology excluded as their subject area does not encounter pregnancy or lactation-related prescribing or medication management.

It is imperative that there is consistent and practical knowledge available to healthcare providers in order to support women and their families through healthy pregnancies, and support breastfeeding for as long as possible. Research consistently shows that in order to increase breastfeeding rates healthcare providers need continued education on the topic; [18,19] as well as direction on how best to access this information. This includes the need to ensure healthcare providers have adequate knowledge on vaccinations, their uptake and safety in pregnancy. Medical practitioners play an integral role in advocating for vaccination, with work demonstrating poor healthcare professional understanding on vaccine safety as a contributory factor when discussing vaccination [20].

This study has a number of strengths and limitations. This novel review of medical postgraduate education curricula has provided information on a topic that has not been examined in depth to date. It provides a basis to advocate for increased inclusion of this topic in curricula in order to support healthcare providers, as well as women, infants and their families. However, given that we were able to access only documents available on the websites of each of the colleges, there may be alternative documents that have been circulated within the training groups. This review was confined to the Republic of Ireland and we were unable to access all the equivalent curricula of other countries in order to allow full comparison between countries. However, based on a limited review of other available curriculums, similar deficits exist internationally.

It is thus essential that the postgraduate training bodies of Ireland, the United Kingdom and internationally review their curricula to include meaningful and integrated education for healthcare providers on the safe use of appropriate medication in pregnancy and during lactation. Through the utilization of current resources, such as the Royal College of Physicians Acute Care Toolkit [21] and bodies such as the Irish Medicines in Pregnancy Service [22], clinicians and other healthcare providers can be supported to access medication safety information. This could lead to a reduction in advice such as “pump and dump”, early cessation of breastfeeding or compromise a choice in medication management [23]. Equally, it is essential to ensure that prescribers are aware of the risk-benefit balance when prescribing medication and how individualized care decisions need to be made in caring for women and their infants. Repeated reports from bodies such as Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK (MBRRACE-UK) advise to continually evaluate the risk-benefit ratio when considering treatments as poor decisions about continuing treatment have led to maternal mortality and morbidity [24]. Future research should evaluate both the professional and public perception of medication education in pregnancy and lactation, as well as resources that are utilized in order to improve and promote these resources.

Our research group plans to lead out in the design and provision of a national structured program to fill this gap in postgraduate medical education. Additionally, funding of services in this area would provide scope to expand this service to provide individualized information to women and their healthcare providers, with the ultimate aim of providing safe, consistent quality care for future generations. Through focusing on this, we can ensure that “the last true therapeutic orphan” [25] is no longer neglected in the provision of medication management in pregnancy and lactation.

Declaration of Competing Interest

The authors have no conflicts of interest to declare.

References

- [1] deWaard M, Blomjous BS, Hol MLF. Medication use during pregnancy and lactation in a dutch population. *J Hum Lact* 2018;35(1):154–64.
- [2] Prenatal corticosteroids for reducing morbidity and mortality after preterm birth. In: Reynolds LA, Tansey EM, editors. Wellcome witnesses to twentieth century medicine, Vol. 25. London: Wellcome Trust Centre for the History of Medicine at UCL; 2005.
- [3] Stock SJ, Norman JE. Medicines in pregnancy. *F1000Res* 2019;8. doi:<http://dx.doi.org/10.12688/f1000research.17535.1> F1000 Faculty Rev-911. Published 2019 Jun 20.
- [4] Organisation for Economic Co-operation and Development. Fertility Rates. Accessed on 15/1/2021 at [<https://data.oecd.org/pop/fertility-rates.htm>].
- [5] Central Statistics Office. Census. 2016 Accessed on 15/1/2021 at [<https://data.cso.ie/#>].
- [6] Central Statistics Office. Vital statistics yearly summary. 2020 May 29, Accessed on 15/1/2021 at [<https://www.cso.ie/en/releasesandpublications/ep/p-vs/vitalstatisticsyearlysummary2019/>].
- [7] Wisner KL, Jeong H, Chambers C. Use of antipsychotics during pregnancy: pregnant women get sick-Sick women get pregnant. *JAMA Psychiatry* 2016;73(9):901–3. doi:<http://dx.doi.org/10.1001/jamapsychiatry.2016.1538>.
- [8] World Health Organisation. Guideline: counselling of women to improve breastfeeding practices Jan. World Health Organisation; 2018.
- [9] Al-Sawalha NA, Sawalha A, Tahaineh L, Almomani B, Al-Keilani M. Healthcare providers' attitude and knowledge regarding medication use in breastfeeding women: a Jordanian national questionnaire study. *J Obstet Gynaecol* 2018;38(February (2)):217–21. doi:<http://dx.doi.org/10.1080/01443615.2017.1345876> Epub 2017 Sep 14. PMID: 28903598.
- [10] Esselmont E, Moreau K, Aglipay M, Pound CM. Residents' breastfeeding knowledge, comfort, practices, and perceptions: results of the Breastfeeding Resident Education Study (BREST). *BMC Pediatr* 2018;18(170). doi:<http://dx.doi.org/10.1186/s12887-018-1150-7>.
- [11] Holtzman O, Usherwood T. Australian general practitioners' knowledge, attitudes and practices towards breastfeeding. *PLoS One* 2018;13(2):e0191854.
- [12] Finneran B, Murphy K. Breast is best for GPs—or is it? Breastfeeding attitudes and practice of general practitioners in the mid-west of Ireland. *Ir Med J* 2004;97(9):268–70.
- [13] Royal College of Physicians of Ireland Higher Specialist Training Curricula. Accessed on 15/1/2021 at [<https://www.rcpi.ie/training/our-specialties/>].
- [14] Royal College of Surgeons of Ireland Curricula. Accessed on 15/1/2021 at [<https://www.rcsi.com/surgery/>].
- [15] College of Psychiatrists of Ireland Postgraduate Training Curriculum. Accessed on 15/1/2021 at [<https://www.irishpsychiatry.ie>].
- [16] The College of Anaesthesiologists of Ireland Curricula. Accessed on 15/1/2021 at [<http://www.anaesthesia.ie>].
- [17] The Irish College of General Practitioners Curriculum. Accessed on 15/1/2021 at [<http://www.icgp.ie>].
- [18] Taylor JS, Bell E. Medical education and leadership in breastfeeding medicine. *Breastfeed Med* 2017;12(October (8)):476–8. doi:<http://dx.doi.org/10.1089/bfm.2017.0104> Epub 2017 Aug 17. PMID: 28817304.
- [19] Biggs KV, Fidler KJ, Shenker NS, Brown H. Are the doctors of the future ready to support breastfeeding? A cross-sectional study in the UK. *Int Breastfeed J* 2020;46. doi:<http://dx.doi.org/10.1186/s13006-020-00290-z>.
- [20] O'Shea A, Cleary B, McEntee E, Barrett T, O'Carroll A, Drew R, et al. To vaccinate or not to vaccinate? Women's perception of vaccination in pregnancy: a qualitative study. *Bjgp Open* 2018;2(April 4 (2)). doi:<http://dx.doi.org/10.3399/bjgpopen18X101457> PMID: 30564712; PMCID: PMC6184095. bjgpopen18X101457.
- [21] Royal College of Physicians, UK. Acute care toolkit 15: managing acute medical problems in pregnancy Oct. 2019.
- [22] Rotunda Hospital Dublin. Irish Medicines in Pregnancy Service.
- [23] Hussaini SY, Dermele N. Knowledge, attitudes and practices of health professionals and women towards medication use in breastfeeding: a review. *Int Breastfeed J* 2011;6(11). doi:<http://dx.doi.org/10.1186/1746-4358-6-11>.
- [24] Knight M, Bunch K, Tuffnell D, Shakespeare J, Kotnis R, Kenyon S Kurinczuk JJ, editors. On behalf of MBRRACE-UK. Saving lives, improving mothers' care-lessons learned to inform maternity care from the UK and Ireland confidential enquiries into maternal death and morbidity 2015–2017. Oxford: National Perinatal Epidemiology Unit, University of Oxford; 2019.
- [25] Stika C, Frederiksen M. Drug therapy in pregnant and nursing women. In: Atkinson Jr. AJ, Daniels CE, Dedrick RL, editors. Principles of clinical pharmacology. New York, NY: Academic Press; 2001. p. 277–91.



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Dr Fergal O'Shaughnessy is a pharmacist and honorary clinical lecturer at the School of Pharmacy, RCSI. He was recently awarded a PhD as a member of the SPHeRE programme at the Division of Population Health Sciences, Royal College of Surgeons in Ireland. He is a graduate of RCSI and Trinity College Dublin, and he holds a position of honorary clinical lecturer at the School of Pharmacy, RCSI. In 2018, he was awarded a Fulbright Irish Student Award, developing methods to identify women who are at risk of developing potentially life-threatening blood clots after childbirth.



Dr Nicola Maher is a Consultant Obstetrician and Gynaecologist with a special interest in maternal medical complications of pregnancy, labour ward management, early pregnancy and general gynaecology. She is the lead consultant in the antenatal clinic for women with epilepsy and part of the maternal medicine team. Nicola originally graduated from Trinity College in 1997 with a degree in pharmacy and worked as a pharmacist before pursuing a career in medicine. She studied in UCD Medical School and subsequently graduated in 2007. She then underwent higher specialist training in obstetrics and gynaecology in Ireland, gaining experience in all three Dublin maternity hospitals, University Hospital

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